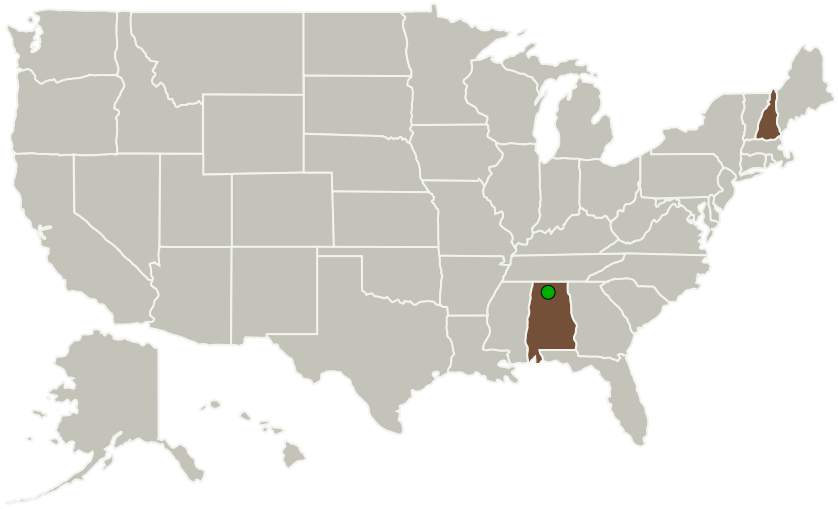
Silica-Silica Mirror Substrate Fabrication Technology, Phase I

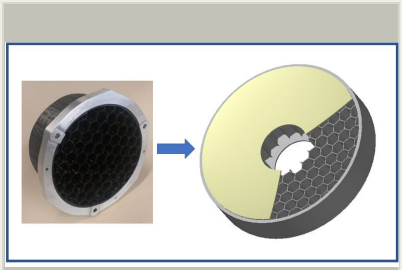
Completed Technology Project (2017 - 2017)

Project Introduction

Mentis Sciences, Inc. Proposes to develop a thin walled Silica-Silica composite that can be used as part of a honeycomb core sandwich panel that will form a mirror substrate that has a low coefficient of thermal expansion that is matched in all directions. The sandwich panel will be manufactured as a quartz polysiloxane composite. Following the cure, organics will be burned out and the system will be backfilled using Tetraethyl orthosilicate as a silica precursor. Following conversion, the resulting silica-silica composite will be suitable for use as a mirror substrate. The resulting product will be an ideal solution for reducing the areal cost of ultraviolet and optical mirror systems while meeting the stringent performance requirements of these systems. The novel manufacturing process used by Mentis will allow for thinner walls than have been used on mirrors in the past, resulting in a lightweight materials solution. During Phase I, Mentis will develop the Silica-Silica manufacturing process, and obtain preliminary modulus, cte and thermal conductivity data. In addition, a top-level feasibility study will be conducted and a small-scale piece of silica-silica honeycomb sandwich panel will be manufactured.

Primary U.S. Work Locations and Key Partners





Silica-Silica Mirror Substrate Fabrication Technology, Phase I Briefing Chart Image

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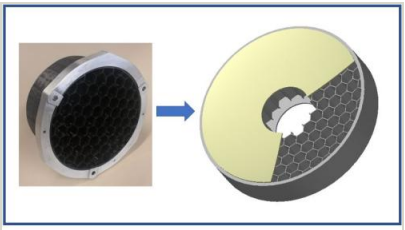
Organizations Performing Work	Role	Type	Location
Mentis Sciences, Inc.	Lead Organization	Industry	Manchester, New Hampshire
Marshall Space Flight Center(MSFC)	Supporting Organization	NASA Center	Huntsville, Alabama

Primary U.S. Work Locations	
Alabama	New Hampshire

Images



Briefing Chart Image
Silica-Silica Mirror Substrate Fabrication Technology, Phase I Briefing Chart Image
(https://techport.nasa.gov/image/132120)

Organizational Responsibility

Responsible Mission Directorate:
Space Technology Mission Directorate (STMD)

Lead Organization:
Mentis Sciences, Inc.

Responsible Program:
Small Business Innovation Research/Small Business Tech Transfer

Project Management

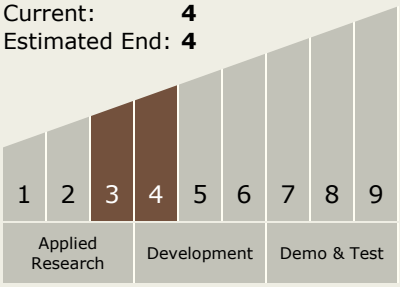
Program Director:
Jason L Kessler

Program Manager:
Carlos Torrez

Principal Investigator:
Robert W Lumpkins

Technology Maturity (TRL)

Start: **3**
Current: **4**
Estimated End: **4**



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Technology Areas

Primary:

- TX08 Sensors and Instruments
  - TX08.2 Observatories
    - TX08.2.1 Mirror Systems

Target Destinations

The Sun, Earth, The Moon, Mars, Others Inside the Solar System, Outside the Solar System